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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/819,621	03/29/2001	Kenji Todori	P 280037 T7K0-00S105-1	4396

909 7590 01/05/2005

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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 01/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/819,621	TODORI ET AL.	
	Examiner	Art Unit	
	Martin J Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/15/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-14 and 16-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-14 and 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The response provided by the applicant has been read and given careful consideration. Responses to the arguments and an analysis of the claims appears below.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5,7-14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iida et al. EP 0580346, in view of Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=s,se,te) semiconductor nanocrystallites", JACS, Vol. 115(19) pp. 8706-8715 (1993) and Liz-Marzan, et al. WO 99/291934.

Iida et al. EP 0580346 teaches a high density optical disk with a shutter layer of semiconductor particles dispersed in a glass or polymeric matrix over coated with a reflective layer as shown in figure 2. Useful semiconductor materials in amounts of 1-80 mol % and having sizes of 0.1 to 50 nm are disclosed. (3/11-33) The use of polymers as the matrix materials, including PMMA, polycarbonate, polystyrenes, polyolefins, and epoxies is disclosed as its the formation of the layer from a solvent based solution. (3/34-41 and 4/3-13). The reflective layer may be various metals including Ag, Au, Al and Cu. (4/44-51). The use of protective layer is also disclosed. (4/52-57). Another embodiment is shown in figure 3.

Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=s,se,te) semiconductor nanocrystallites", JACS, Vol. 115(19) pp. 8706-8715 (1993), teaches the synthesis of nanocrystalline semiconductor particles to reduce polydispersity and improve the uniformity of surface derivitazation (capping). (page 8706, right column) The ease of dispersal

in various solvents (alkanes, aromatrics, long chain alcohols, etc) is disclosed. (page 8707, left column). The use of these in optical field is disclosed. (page 8706, left column) The sizes of the particles is between 1.5 and 11.5 nm (page 8707, left column). The surface derivatization is disclosed as preventing flocculation (page 8708, right column). The particles sizes as disclosed as affecting the absorption properties as shown in figure 3.

Liz-Marzan, et al. WO 99/291934 teaches methods for stabilizing particles to prevent agglomeration/coalescence without affecting their properties.(2/16-22). The ligands which bond to the surface of the particles may be thiols, amines, phosphines, phosphates, borates, carboxylates, silicates, siloxy, ... (3/10-28). The stabilization of CdS and other semiconducor materials, having sizes of less than 100 nm, preferably less than 40 nm is disclosed. (7/24-8/17 and examples) The use of this technique for stabilizing the particles for optical uses in a variety of matrices, including polymers, is disclosed. (13/18-23).

It would have been obvious to one skilled in the art to modify the article of Iida et al. EP 0580346 by using the processes of either Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=s,se,te) semiconductor nanocrystallites", JACS, Vol. 115(19) pp. 8706-8715 (1993) with a reasonable expectation of gaining in monodispersity and stability in both solvents and the polymeric matrix based upon the teachings of Murray et al., "Synthesis and Characterization of nearly monodisperse CdE (E=s,se,te) semiconductor nanocrystallites", JACS, Vol. 115(19) pp. 8706-8715 (1993) and Liz-Marzan, et al. WO 99/291934 of the desirability of stabilizing the particles in either solvents or polymeric matrices and the disclosure of the dispersion of these particles in the polymeric matrix by Iida et al. (3/15-20).

The declaration of Kenji TODORI shows the full equations dealing with the absorption characteristics and the transition probability. This would be much more instructive if the terms were properly identified and any effect of the particles size discussed. The instant specification notes that the particles sizes and their distribution affect w_o, which clearly plays a part with respect to the absorption cross section as a function of wavelength. (see prepub at [0077-0079]) To show figure A and assert that it shows more than the trend for a certain particles is misleading as it assumes a single particle composition (ie material) and size. Clearly, the measurements are best made at the absorption maxima of the composition as this is where the absorption probability is at its maximum. Looking at the data for samples 2A-2E, the absorption saturation characteristics are the same percentage for all the samples. Sample 2D is more polydisperse as evidenced by D_{mod}/D_{bohr}. Samples 2A,2B,2C and 2E have similar modality and absorption saturation characteristics at 1MW/cm^2 and the absorption differences A_{max} are attributable to differences in particle size and composition. What would clearly establish unobvious results would be 3 nm CdSe particles dispersed in PMMA and data relating to D_{mod}, D_{mod}/D_{bohr}, A_{max}, wavelength of measurement, the absorption saturation characteristics and **a discussion as to the relevance of the absorption saturation characteristics of the film in functioning as a super-resolution film and why a few percent would be important. The application describes the measurement of the size of the aperture formed in the super resolution film (prepub at [0156]). This would also be interesting and clearly relevant to the use of the composition, if the applicant has data on this.**

The limitation regarding the D_{mod}/D_{bohr} has been considered. The methods of forming sample 2D of the instant application refers to the use of "a method similar to that described in

C.B. Murray" which is the Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=S,Se,Te) semiconductor nanocrystallites", JACS, Vol. 115(19) pp. 8706-8715 (1993) reference applied. The particles size distribution is determined after preparing the particles and prior to their dispersion. These particles have a D_{mod} of 6.5 nm [0133] (5 in table 2 at [0143], while those prepared in the manner ascribed to Gindele et al. [0097], have D_{mod} of 1.0 to 2.8 nm (1.5 to 3.0 nm in table 2 [0143]. **There seems to be a discrepancy between the data in the table and that appearing in the text of the examples.** It is not clear what differences between the process of Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=S,Se,Te) semiconductor nanocrystallites", and the comparative example are and how that might affect the resultant particles other than the particles produced by Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=S,Se,Te) semiconductor nanocrystallites" are 3.7 nm, not 6.5 as produced in the comparative example 2D. The Bohr radius is just under 5 nm. If this is the case, then using the procedure of Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=S,Se,Te) semiconductor nanocrystallites" would yield a D_{mod}/D_{bohr} of ~0.74, not 1.32.. If the initially formed crystallites are larger, then they will also be larger when dispersed. It is also not clear that Iida et al. EP 0580346 uses the process of Murray et al., "synthesis and Characterization of nearly monodisperse CdE (E=S,Se,Te) semiconductor nanocrystallites" to form the crystallites. There may be a journal article by Iida et al., which details the exact synthetic procedure used. If the applicant finds such an article, it should be made of record in the subsequent response. The examiner notes that the absorption saturation characteristics of samples 2A – 2E are very similar. Some of this may come from differences in the description/characterization of sizes by the instant application and the references.

The embodiment using the dendrites appears to be allowable at this juncture.

4 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Martin J Angebranndt
Primary Examiner
Art Unit 1756

01/02/2005